

DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES

OFFICE ENGINEER

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November 2, 2011

03-Yol-5-0.3/R14.0

03-2F0104

Project ID 0300020442

ACIM-0056(337)E

Addendum No. 1

Dear Contractor:

This addendum is being issued to the contract for CONSTRUCTION ON STATE HIGHWAY IN YOLO COUNTY IN AND NEAR WOODLAND FROM 0.3 MILE WEST OF SACRAMENTO RIVER BRIDGE TO 0.2 MILE NORTH OF ADAMS CREEK BRIDGE.

Submit bids for this work with the understanding and full consideration of this addendum. The revisions declared in this addendum are an essential part of the contract.

Bids for this work will be opened on Tuesday, November 8, 2011.

This addendum is being issued to revise the Project Plans, the Notice to Bidders and Special Provisions, and the Bid book.

Project Plan Sheet 3 is revised. A copy of the revised sheet is attached for substitution for the like-numbered sheet.

Project Plan Sheet 36 is revised as follows: .

Plan Sheet	Sheet No.	Quantity
COUNTRY ROAD 101 UC	36	REMOVE ASPHALT CONCRETE SURFACING 9126 SQFT

In the Special Provisions, Section 10-1.17, "EXISTING HIGHWAY FACILITIES," subsection "REMOVE ASPHALT CONCRETE SURFACING," subsection "Construction," the seventh paragraph is revised as follows:

"Remove existing asphalt concrete surfacing by cold milling. At least 1/2 inch of existing asphalt concrete surfacing must remain after cold milling activities. Remove remaining asphalt surfacing by other means approved by the Engineer. The existing concrete slab must not be damaged during removal operations."

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In the Special Provisions, Section 10-1.17, "EXISTING HIGHWAY FACILITIES," subsection "REMOVE ASPHALT CONCRETE SURFACING," subsection "Measurement and Payment," the second paragraph is revised as follows:

"The contract price paid per square foot for remove asphalt concrete surfacing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in remove asphalt concrete surfacing, complete in place, including the removal of the remaining 1/2-inch of asphalt surfacing by other means, abrasive blast cleaning, removal of all laitance, contaminants and foreign material, sweeping the deck surface and blowing the deck surface clean using high pressure air, including the removal of any material between the asphalt concrete surfacing and portland cement concrete deck, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer."

In the Special Provisions, Section 10-1.23, "RUBBERIZED HOT MIX ASPHALT (GAP GRADED)," is revised as attached.

In the Special Provisions, Section 10-1.24, "RUBBERIZED HOT MIX ASPHALT (OPEN GRADED)," is revised as attached.

In the Bid book, in the "Bid Item List," Item 10 is revised, as attached.

To Bid book holders:

Replace (the entire) page 3 of the "Bid Item List" in the Bid book with the attached revised page 3 of the Bid Item List. The revised Bid Item List is to be used in the bid.

Inquiries or questions in regard to this addendum must be communicated as a bidder inquiry and must be made as noted in the Notice to Bidders section of the Notice to Bidders and Special Provisions.

Indicate receipt of this addendum by filling in the number of this addendum in the space provided on the signature page of the Bid book.

Submit bids in the Bid book you now possess. Holders who have already mailed their book will be contacted to arrange for the return of their book.

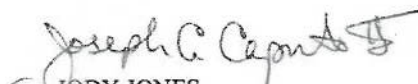
Inform subcontractors and suppliers as necessary.

This addendum and its attachments are available for the Contractors' download on the Web site:

http://www.dot.ca.gov/hq/esc/oe/project_ads_addenda/03/03-2F0104

If you are not a Bid book holder, but request a book to bid on this project, you must comply with the requirements of this letter before submitting your bid.

Sincerely,


JODY JONES
District Director

Attachments

10-1.23 RUBBERIZED HOT MIX ASPHALT (GAP GRADED)

GENERAL

Summary

This work includes producing and placing rubberized hot mix asphalt (gap graded) (RHMA-G) using the Quality Control / Quality Assurance process with warm mix asphalt technologies. Warm mix asphalt technologies are defined as additives or processes that allow for a reduction in the temperature at which asphalt mixtures are produced and placed.

Comply with Section 39, "Hot Mix Asphalt," of the Standard Specifications.

Use one of the following warm mix asphalt additives:

Product name:	Evotherm
Producer name:	MeadWest Vaco Corporation
Contact:	Scott Dmytrow or Wade Miller
Phone number:	(916) 825 – 9415 or (949) 495 – 4822

Product name:	Advera
Producer name:	PQ Corporation
Contact:	Annette Smith
Phone number:	(610) 651 – 4469

Product name:	Sasobit
Producer name:	Sasol Wax Americas, Inc.
Contact:	Larry Michael
Phone number:	(301) 745 – 3334

Submittals

Submit information from producer selected about each warm mix asphalt additive used. Submit the method and location for addition of additive.

Submit samples of plant-produced loose RHMA-G with warm mix asphalt additives. The Engineer determines the quantity and time for sampling.

Submit a list of names participating in the prepaving conference. Identify each participant's name, employer, title, and role in the construction of RHMA-G with warm mix asphalt additives.

Submit the log of production data in electronic and printed media at the end of each production shift, or when requested by the Engineer. Each set of production data in electronic media must be in line feed carriage return, on one line, on a separate record, and with sufficient fields to satisfy the amount of data specified. The daily log must include:

1. Date of production
2. Time of day the data is captured
3. Data titles at least once per report
4. Aggregate size being treated
5. Flow rate of wet aggregate collected directly from the aggregate weigh belt
6. Aggregate moisture content at the time of treatment expressed as a percent of the dry aggregate
7. Calculated difference between the agreed warm mix asphalt additive ratio and the actual warm mix asphalt additive ratio

Quality Control / Quality Assurance Projects

With the job mix formula (JMF) submittal, submit:

1. California Test 204 plasticity index results
2. California Test 371 minimum dry strength results for untreated RHMA-G
3. California Test 371 tensile strength ratio results for untreated RHMA-G
4. California Test 371 minimum dry strength and tensile strength ratio results for treated RHMA-G if untreated RHMA-G tensile strength ratio is below 70
5. AASHTO T 324 (Modified) test results using plant produced RHMA-G

At production start-up and once during production, submit samples split from your RHMA-G production sample for California Test 371 and AASHTO T324 (Modified) test to the Engineer and the Transportation Laboratory, Attention: Moisture Test.

With the JMF submittal, at production start-up, and each 10,000 tons, submit the California Test 371 test results and AASHTO T324 (Modified) test results for mix design and production to the Engineer and electronically to:

With the JMF submittal, at production start-up evaluation, and each 10,000 tons, submit 2 test specimens from AASHTO T324 (Modified) test to the Engineer.

With the JMF submittal, submit to the Engineer and the Transportation Laboratory, Attention: Moisture Test, samples for California Test 371 and AASHTO T324 (Modified) test split from your mix design samples of:

1. Aggregate
2. Supplemental fines
3. Asphalt rubber binder
4. Antistrip treatment
5. Warm Mix Additive

Mix Design

Quality Control / Quality Assurance Projects

For RHMA-G using warm mix asphalt technology, for mix design, prepare RHMA-G mix samples in accordance with California Test 304, except cure samples in a forced air draft oven at 275 °F for 4 hours ± 10 minutes.

For the mix design, determine the plasticity index of the aggregate blend under California Test 204. Choose an antistrip treatment and use the corresponding laboratory procedure for the mix design in compliance with:

Antistrip Treatment Lab Procedures for Mix Design

Antistrip Treatment	Lab Procedure
Plasticity index from 4 to 10 ^a	
Dry hydrated lime with marination	LP-6
Lime slurry with marination	LP-7
Plasticity index less than 4	
Liquid	LP-5
Dry hydrated lime without marination	LP-6
Dry hydrated lime with marination	LP-6
Lime slurry with marination	LP-7

Notes:

^a If the plasticity index greater than 10, do not use that aggregate blend.

The mix design for RHMA-G must produce RHMA-G with the values for the quality characteristic shown in the following table:

HMA Mix Design Requirements

Quality characteristic	Test method	Requirement
Moisture sensitivity (minimum dry tensile strength, lb/in ²)	California Test 371	150
Moisture sensitivity (tensile strength ratio, %)	California Test 371	70

For the mix design, if the tensile strength ratio is less than 70:

1. Choose from the antistrip treatments specified based on plasticity index.
2. Test treated RHMA-G under California Test 371.
3. Treat to a minimum tensile strength ratio of 70.

For the mix design, determine AASHTO T 324 (Modified) on plant produced untreated RHMA-G.

AASHTO T 324 (Modified) is AASHTO T 324 "Hamburg Wheel-Track Testing of Compacted Hot Mix Asphalt (HMA)" with the following parameters:

1. Target air voids = 7+/- 1%
2. Number of test specimens = 4
3. Test specimen= 6" gyratory compacted specimen
4. Test temperature = 122 °F +/- 2°F
5. Measurements: Impression at every 100 passes
6. Inflection point¹
7. Testing shut off = 20,000 passes

¹ The inflection point is defined as: The number of wheel passes at the intersection of the creep slope and the stripping slope.

The mix design for RHMA-G must produce RHMA-G when tested under AASHTO T 324 (Modified) that complies with the following requirements in Table 1 based on the performance graded (PG) asphalt binder in the RHMA-G:

Table 1
Hot Mix Asphalt Requirements

Quality characteristic	Test method	Minimum number of passes at 0.5" average rut depth	Inflection point minimum number of passes
Hamburg wheel test			
PG 64 or lower	AASHTO T 324 (Modified)	10,000	5,000
PG 70		15,000	7,500
PG 76 or higher		20,000	10,000

If the AASHTO T 324 (Modified) results do not meet the requirements of Table 1:

1. Choose from the antistrip treatments specified based on plasticity index.
2. Test treated plant produced RHMA-G.
3. Treatment chosen must produce RHMA-G with the minimum values in Table 1.

MATERIALS

Asphalt Binder

Asphalt binder mixed with asphalt modifier and crumb rubber modifier (CRM) for asphalt rubber binder must be PG 64-16.

Aggregate

The aggregate for RHMA-G must comply with the 3/4-inch grading.

Asphalt Rubber Binder Content

Determine the amount of asphalt rubber binder to be mixed with the aggregate for RHMA-G under California Test 367 except:

1. Determine the specific gravity used in California Test 367, Section B, "Void Content of Specimen," using California Test 308, Method A.

2. California Test 367, Section C, "Optimum Bitumen Content," is revised as follows:

- 2.1. Base the calculations on the average of 3 briquettes produced at each asphalt rubber binder content.
 - 2.2. Use California Test 309 to determine theoretical maximum specific gravity and density of the RHMA-G.
 - 2.3. Plot asphalt rubber binder content versus average air voids content based on California Test 309 for each set of three specimens on Form TL-306 (Figure 3), and connect adjacent points with a best-fit curve.
 - 2.4. Plot asphalt rubber binder content versus average Hveem stability for each set of three specimens and connect adjacent points with a best-fit curve.
 - 2.5. Calculate voids in mineral aggregate (VMA) and voids filled with asphalt (VFA) for each specimen, average each set, and plot the average versus asphalt rubber binder content.
 - 2.6. Calculate the dust proportion and plot versus asphalt rubber binder content.
 - 2.7. From the curve plotted in Step 2.3, select the theoretical asphalt rubber binder content that has 5.0 percent air voids.
 - 2.8. At the selected asphalt rubber binder content, evaluate corresponding voids in mineral aggregate, voids filled with asphalt, and dust proportion to verify compliance with requirements. If necessary, develop an alternate composite aggregate gradation to conform to the RHMA-G requirements.
 - 2.9. Record the asphalt rubber binder content in Step 2.7 as the Optimum Bitumen Content (OBC).
 - 2.10. To establish a recommended range, use the OBC as the high value and 0.3 percent less as the low value. Notwithstanding, the recommended range must not extend below 7.0 percent. If the OBC is 7.0 percent, then there is no recommended range, and 7.0 percent is the recommended value.
3. Laboratory mixing and compaction must comply with California Test 304, except the mixing temperature of the aggregate must be between 300 °F and 325 °F. The mixing temperature of the asphalt-rubber binder must be between 350 °F and 425 °F. The compaction temperature of the combined mixture must be between 290 °F and 300 °F.

CONTRACTOR QUALITY CONTROL

Quality Control / Quality Assurance Projects

For RHMA-G using warm mix asphalt technology, for California Test 304, prepare field samples in accordance with California Test 304, except cure samples in a forced air draft oven at 275 °F for 4 hours ± 10 minutes.

Perform sampling and testing at the specified frequency and location for the following additional quality characteristics:

Minimum Quality Control

Quality characteristic	Test method	Minimum sampling and testing frequency	Requirement	Location of sampling	Maximum reporting time allowance
Moisture sensitivity	California Test 371	First production day and 1 per 10,000 tons	Report Only	Loose mix behind the paver. See California Test 125	10 working days
Hamburg wheel test ^a	AASHTO T 324 (Modified)	First production day and 1 per 10,000 tons	Table 1	Loose mix behind the paver. See California Test 125	48 hours ^b

Note:

^aAASHTO T 324 (Modified) is AASHTO T 324 "Hamburg Wheel-Track Testing of Compacted Hot Mix Asphalt (HMA)" with the following parameters:

1. Target air voids = 7+/- 1%
2. Number of test specimens = 4
3. Test specimen= 6" gyratory compacted specimen
4. Test temperature = 122 °F +/- 2°F
5. Measurements: Impression at every 100 passes
6. Inflection point¹
7. Testing shut off = 20,000 passes

¹ The inflection point is defined as: The number of wheel passes at the intersection of the creep slope and the stripping slope.

^bSubmit to the Engineer within 48 hours of sampling, 2 test specimens and data for AASHTO T 324 (Modified).

The Department does not use California Test 371 test results from production to determine specification compliance.

ENGINEERS ACCEPTANCE

For RHMA-G using warm mix asphalt technology, for California Test 304, prepare field samples in accordance with California Test 304, except cure samples in a forced air draft oven at 275 °F for 4 hours ± 10 minutes.

The Engineer samples RHMA-G for acceptance testing and tests for the following additional quality characteristic:

HMA Acceptance

Quality characteristic	Test method	Requirement	Sampling location
Hamburg wheel test ^a	AASHTO T 324 (Modified)	Table 1	Loose mix behind the paver. See California Test 125

Note:

^aAASHTO T 324 (Modified) is AASHTO T 324 "Hamburg Wheel-Track Testing of Compacted Hot Mix Asphalt (HMA)" with the following parameters:

1. Target air voids = 7+/- 1%
2. Number of test specimens = 4
3. Test specimen= 6" gyratory compacted specimen
4. Test temperature = 122 °F +/- 2°F
5. Measurements: Impression at every 100 passes
6. Inflection point¹
7. Testing shut off = 20,000 passes

¹ The inflection point is defined as: The number of wheel passes at the intersection of the creep slope and the stripping slope.

CONTRACT NO. 03-2F0104

ADDED PER ADDENDUM NO. 1 DATED NOVEMBER 2, 2011

CONSTRUCTION

General

During production, make loose RHMA-G available at the plant for sampling. The Engineer determines the quantity and time for sampling.

Prepaving conference

Discuss RHMA-G at the prepaving conference. Discuss the methods for production and placement including contingency planning and standards or workmanship.

Provide the facility for the prepaving conference. Attendees must include:

1. Project Manager
2. Superintendent
3. Technical representatives from each warm mix additive company
4. Paving subcontractors
5. Asphalt rubber binder supplier
6. Plant manager
7. Plant operator

Technical Representatives

A technical representative from each warm mix asphalt additive supplier must be present during the first week of production and placement of RHMA-G and thereafter be available to the Contractor as needed. The technical representative must advise you, the Engineer, and the asphalt rubber binder producer. The technical representative must direct the mix operation as it relates to the warm mix asphalt additive.

The technical representative must advise the producer regarding plant and controller modifications necessary for product delivery and proper mixing. Plant modifications must comply with Material Plant Quality Program (MPQP).

Material Plant Quality Program

Review the plant to assure compliance with weights and measures under MPQP within 30 days before production of RHMA-G.

Data Collection

The device controlling warm mix asphalt additive proportioning must produce a log of production data. The log must be a series of data captured at 1-minute intervals during production. Each 1-minute data set must register the production activity for that minute and not be a summation of the preceding minute. Each 1-minute data set represents an amount of material produced 5 minutes before and 5 minutes after the capture time. Store collected data with the plant control device while the contract is in progress.

Proportioning Warm Mix Asphalt Additives

General

Proportion warm mix asphalt additives by weight. Use either a continuous or batch type plant.

Continuous Mixing

If continuous proportioning for RHMA-G with warm mix asphalt additive is used, determine the exact ratio of warm mix asphalt additive to the total RHMA-G at the production rates to be used. Rate-of-flow indicators and totalizers for like materials must be accurate within 0.5 percent from each other. Comply with the following:

1. Weigh dry warm mix asphalt additives with a belt scale or loss in weight feeder. If operating from 30 to 100 percent of production capacity, the average difference between the indicated weight of material delivered and the actual weight delivered must not exceed 2.0 percent of the actual weight for 3 individual runs. For any of the 3 individual runs, the indicated weight of material delivered must not vary from the actual weight delivered by more than 3.0 percent of the actual weight. The platform scale's maximum capacity must not exceed 2.5 tons with a maximum graduation size of 0.10 pound. Each test run must be at least 100 pounds of warm mix asphalt additive.
2. The addition device must rest on either concrete pads and or steel plates. The steel plates must be 1.5 inch thick and be no smaller than 20 inches width and height
3. Measure emulsified warm mix asphalt additive with a meter. If operating from 50 to 100 percent of production capacity, the difference between the indicated weight of emulsion delivered and the actual weight delivered must not exceed 1.0 percent of the actual weight for 3 individual runs. Weigh tests on a platform scale located at the proportioning plant. The platform scale's maximum capacity must not exceed 2.5 tons with a maximum graduation size of 0.10 pound. Run tests for at least 300 gallons of emulsified warm mix asphalt additive.

Batch Mixing

If batch proportioning for RHMA-G with warm mix asphalt additive is used, comply with the following:

1. Proportion dry warm mix asphalt additives by weight. Weigh the additive at the warm mix asphalt production site with a scale appropriate for the amount of additive weighed. If batches use dry warm mix additive weighing less than 1 ton, use an automatic batch controller. Run tests for at least 100 pounds of dry warm mix asphalt additives.
2. Measure emulsified warm mix asphalt additive with a meter. If operating from 50 to 100 percent of production capacity, the difference between the indicated weight of emulsion delivered and the actual weight delivered must not exceed 1.0 percent of the actual weight for 3 individual runs. Weigh tests on a platform scale located at the proportioning plant. The platform scale's maximum capacity must not exceed 2.5 tons with a maximum graduation size of 0.10 pound. Run tests for at least 300 lbs of emulsified warm mix asphalt additive.
3. Proportioning for pre-blending the asphalt rubber binder and zeolite
 - a) Weigh dry warm mix asphalt additives with a belt scale or loss in weight feeder. If operating from 30 to 100 percent of production capacity, the average difference between the indicated weight of material delivered and the actual weight delivered must not exceed 2.0 percent of the actual weight for 3 individual runs. For any of the 3 individual runs, the indicated weight of material delivered must not vary from the actual weight delivered by more than 3.0 percent of the actual weight. The platform scale's maximum capacity must not exceed 2.5 tons with a maximum graduation size of 0.10 pound. Each test run must be at least 100 pounds of warm mix asphalt additive.
 - b) The addition device will rest on a smooth, level surface, either concrete pads or steel plates. The steel plates will be 1.5 inch thick and be no smaller than 20 inches width and height.
 - c) The asphalt rubber binder will be measured with a mass flow meter (micromotion). The accuracy of the addition device shall be such that, when operating between 30 and 100 percent of production capacity, the average difference between the indicated weight of material delivered and the actual weight of material delivered will not exceed 1.0 percent of the actual weight for 3 individual runs. For any of the 3 individual runs, the indicated weight of material delivered shall not vary from the actual weight delivered by more than 2.0 percent of the actual weight. Test duration will be determined by the size of the flowmeter, following the CT 109 specification.

RHMA-G Production and Placement

Produce an asphalt mixture within the temperature range of 285°F and 325 °F.

For RHMA-G:

1. Only spread and compact if the atmospheric temperature is at least 50 °F and the surface temperature is at least 50 °F.
2. Complete the first coverage of breakdown compaction before the surface temperature drops below 260 °F.
3. Complete breakdown and intermediate compaction before the surface temperature drops below 230 °F.
4. Complete finish compaction before the surface temperature drops below 180 °F.
5. If the atmospheric temperature is below 70 °F, cover loads in trucks with tarpaulins. The tarpaulins must completely cover the exposed load until you transfer the mixture to the paver's hopper or to the pavement surface.

Material Transfer Vehicle

A material transfer vehicle (MTV) must be used. The MTV must:

1. Either receive HMA directly from the truck or use a pickup head to load it from a windrow that can be deposited on the roadway surface for a maximum of 100 feet in length.
2. Transfer HMA directly into the paver's receiving hopper or feed system
3. Remix the HMA, with augurs, before loading the paver
4. Have sufficient capacity to prevent stopping the paver

Rumble Strips

Construct shoulder rumble strips in the top layer of new RHMA-G surfacing.

Before opening the lane to public traffic, pave shoulders and median borders adjacent to a lane being paved.

Place RHMA-G on adjacent traveled way lanes so that at the end of each work shift, the distance between the ends of RHMA-G layers on adjacent lanes is between 5 feet and 10 feet. Place additional RHMA-G along the transverse edge at each lane's end and along the exposed longitudinal edges between adjacent lanes. Hand rake and compact the additional RHMA-G to form temporary conforms. You may place Kraft paper, or another approved bond breaker, under the conform tapers to facilitate the taper removal when paving operations resume.

PAYMENT

The contract price paid per ton for rubberized hot mix asphalt (gap graded) using warm mix asphalt technologies includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, including warm mix additives, prepaving conference, material transfer vehicle, data collection and testing and technical representation, and for doing all the work involved in constructing rubberized hot mix asphalt (gap graded) with warm mix asphalt additives, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.24 RUBBERIZED HOT MIX ASPHALT (OPEN GRADED)

GENERAL

Summary

This work includes producing and placing rubberized hot mix asphalt (open graded) (RHMA-O) with a warm mix asphalt additive using the Standard process.

Comply with Section 39, "Hot Mix Asphalt," of the Standard Specifications and these special provisions.

Use one of the following warm mix asphalt additives:

Product name:	Evotherm
Producer name:	Mead West Vaco Corporation
Contact:	Scott Dmytrow or Wade Miller
Phone Number:	(916) 825-9415 or (949) 495-4822

Product name:	Advera
Producer name:	PQ corporation
Contact:	Annette Smith
Phone number:	(610) 651-4469

Product name:	Sasobit
Producer name:	Sasol Wax Americas, Inc.
Contact:	Larry Michael
Phone number	(301) 745-3334

Submittals

Submit information from each producer about each warm mix asphalt additive. Submit the method and location for addition of each additive.

Submit samples of loose plant-produced RHMA- O_ with warm mix asphalt additives. The Engineer determines the quantity and time for sampling.

Submit the log of production data on electronic and printed media at the end of each production shift, or when requested by the Engineer. Each set of production data on electronic media must be in line feed carriage return, on one line, on a separate record, and with sufficient fields to satisfy the amount of data specified. The daily log must include:

1. Date of production
2. Time of day the data is captured
3. Data titles at least once per report
4. Aggregate size being treated
5. Flow rate of wet aggregate collected directly from the aggregate weigh belt
6. Aggregate moisture content at the time of treatment expressed as a percent of the dry aggregate
7. Calculated difference between the agreed warm mix asphalt additive ratio and the actual warm mix asphalt additive ratio

Data Cores

Three business days before starting coring, submit proposed methods and materials for backfilling data core holes. Submit to the Engineer and electronically to Coring@dot.ca.gov:

1. A summary of data cores taken
2. A photograph of each data core

For each data core, the summary must include:

1. Project identification number
2. Date cored
3. Core identification number
4. Type of materials recovered
5. Type and approximate thickness of unstabilized material not recovered
6. Total core thickness
7. Thickness of each individual material to within:
 - 7.1 For recovered material, 1/2 inch
 - 7.2 For unstabilized material, 1.0 inch
8. Location including:
 - 8.1. County
 - 8.2. Route
 - 8.3. Post mile
 - 8.4. Lane number
 - 8.5. Lane direction
 - 8.6. Station

Each data core digital photograph must include a ruler laid next to the data core. Each photograph must include:

1. The core
2. Project identification number
3. Core identification number
4. Date cored
5. County
6. Route
7. Post mile
8. Lane number
9. Lane direction

After data core summary and photograph submittal, dispose of cores under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Quality Control and Assurance

Do not test RHMA-O for plasticity index and tensile strength ratio.

MATERIALS

Asphalt binder mixed with asphalt modifier and crumb rubber modifier (CRM) for asphalt rubber binder must be PG 64-

10.

The aggregate for RHMA-O must comply with the 1/2-inch grading.

The Engineer uses the following formula to determine the optimum asphalt binder content for RHMA-O:

$$OBC_2 = (OBC_1) \times 1.40$$

where:

OBC_1 = Optimum bitumen content using the specified PG asphalt binder under California Test 368.

OBC_2 = Optimum bitumen content using asphalt rubber binder.

Treat RHMA-O with the same anti-strip treatment used for RHMA Type G.

CONSTRUCTION

General

During production, make loose RHMA-O_ available at the plant for sampling. The Engineer determines the quantity and time for sampling.

Prepaving Conference

Discuss RHMA-O with warm mix asphalt additive at the prepaving conference. Discuss the methods for production and placement including contingency planning and standards or workmanship.

Provide the facility for the prepaving conference. Attendees must include:

1. Project Manager
2. Superintendent
3. Technical representative from each WMA company
4. Paving subcontractor
5. Asphalt rubber binder supplier
6. Plant manager
7. Plant operator

Submit a list of names participating in the prepaving conference. Identify each participant's name, employer, title, and role in construction of RHMA-O with warm mix asphalt additives.

Technical Representatives

A technical representative from each warm mix asphalt additive supplier must be present during the first week of production and placement of RHMA-O and thereafter be available to the Contractor as needed. The technical representative must advise you, the Engineer, and the asphalt rubber binder producer. The technical representative must direct the mix operation as it relates to the warm mix asphalt additive.

The technical representatives must advise the plant manager and plant operator regarding plant and controller modifications necessary for product delivery and proper mixing. Plant modifications must comply with California Test 109.

Plant modifications must comply with Material Plant Quality Program (MPQP).

California Test 109

Review the plant to assure compliance with weights and measures under California Test 109 within 30 days before production of RHMA-O.

Materials Production Quality Program

Review the plant to assure compliance with the MPQP at least 15 days before production of RHMA with warm mix asphalt additives.

Data Collection

The HMA plant process-controller must produce an electronic log of production data. The log will consist of a series of snapshots captured at a maximum of 1-minute intervals throughout the period of daily production. Each snapshot of production data must be a register of production activity at that time and not a summation of the data over the preceding interval to the previous snapshot. The amount of material represented by each snapshot will be that amount produced during the 0.5 minute interval before and the 0.5 minute interval after the capture time. Collect and hold data for the duration of the contract and submit the electronic media to the Engineer, daily or upon request. The snapshot of production data must include the following:

1. Date of production.
2. Plant location
3. Time of day the data is captured
4. Mix type being produced
5. Temperature of the binder and RHMA mixture
6. For a continuous mix operation, the rate of flow of the dry aggregate calculated from the wet aggregate flow rate as determined by the conveyor scale
7. For a continuous mix plant operation, the rate of flow of the asphalt meter
8. For a continuous mix plant operation, the rate of flow of warm-mix ingredient meter
9. For a batch plant operation, actual batch weights of all ingredient
10. The aggregate/binder ratio calculated from metered ingredient output
11. The binder/warm-mix additive ratio calculated from metered output

Electronic media must be presented in a Comma-Separated Values (CSV) format. Captured data, for the ingredients represented by production snapshot, must have allowances for sufficient fields to satisfy the amount of data required by these specifications and include data titles at least once per report

Proportioning Warm Mix Asphalt Additives

General

Proportion all ingredients by weight. The HMA plant process-controller must be the sole source of ingredient proportioning control and be fully interfaced with all scales and meters used in the production process. Ensure that the HMA plant process-controller utilizes the warm-mix additive as an integral ingredient of the HMA mix.

Weighing and metering devices used for the production of warm-mix HMA must meet the requirements of the Material Plant Quality Program (MPQP). When a loss-in-weight meter is used it must meet the requirements of the MPQP and the following:

1. Include at least one complete system re-fill cycle during each calibration test run.
2. Operate the device in a normal run mode for 10 minutes immediately before starting the calibration process.
3. Isolate the scale-system, within the loss-in-weight feeder, from surrounding vibration.
4. Check the scale-system, within the loss-in-weight feeder, for accuracy before and after the calibration process and daily during mix production.
5. For a dry ingredient delivery rate of less than one ton per hour use a 15 minute minimum test run size.
6. The unit's accuracy must comply with the limits of Table B, "Conveyor Scale Testing Extremes," in the MPQP.

Dry ingredient additives for continuous production must be proportioned with a conveyor scale or a loss-in-weight meter. Dry ingredients for batch production must be proportioned with a hopper scale.

Liquid ingredient additive, including a normally dry ingredient made liquid, must be proportioned with a mass flow meter.

Produce warm-mix HMA by using either a continuous mixing or a batch type HMA plant.

Continuous Mixing

If continuous proportioning for RHMA-O with warm mix asphalt additive is used, determine the exact ratio of warm mix asphalt additive to the total RHMA-O at the production rates to be used. Rate-of-flow indicators and totalizers for like materials must be accurate within 0.5 percent from each other. Comply with the following:

1. Weigh dry warm mix asphalt additives with a belt scale or loss in weight feeder. If operating from 30 to 100 percent of production capacity, the average difference between the indicated weight of material delivered and the actual weight delivered must not exceed 1.0 percent of the actual weight for 3 individual runs. For any of the 3 individual runs, the indicated weight of material delivered must not vary from the actual weight delivered by more than 3.0 percent of the actual weight. The platform scale's maximum capacity must not exceed 2.5 tons with a maximum graduation size of 0.10 pound. Each test run must be at least 100 pounds of warm mix asphalt additive.
2. The addition device must rest on either concrete pads and or steel plates. The steel plates must be 1.5 inch thick and be no smaller than 20 inches width and height.
3. Measure emulsified warm mix asphalt additive with a meter. If operating from 50 to 100 percent of production capacity, the difference between the indicated weight of emulsion delivered and the actual weight delivered must not exceed 1.0 percent of the actual weight for 3 individual runs. Weigh tests on a platform scale located at the proportioning plant. The platform scale's maximum capacity must not exceed 2.5 tons with a maximum graduation size of 0.10 pound. Run tests for at least 300 lbs of emulsified warm mix asphalt additive.

Batch Mixing

If batch proportioning for RHMA-O with warm mix asphalt additive is used, comply with the following:

1. Proportion dry warm mix asphalt additives by weight. Weigh the additive at the warm mix asphalt production site with a scale appropriate for the amount of additive weighed. If batches use dry warm mix additive weighing less than 1 ton, use an automatic batch controller. Run tests for at least 100 pounds of dry warm mix asphalt additives.
2. Measure emulsified warm mix asphalt additive with a meter. If operating from 50 to 100 percent of production capacity, the difference between the indicated weight of emulsion delivered and the actual weight delivered must not exceed 1.0 percent of the actual weight for 3 individual runs. Weigh tests on a platform scale located at the proportioning plant. The platform scale's maximum capacity must not exceed 2.5 tons with a maximum graduation size of 0.10 pound. Run tests for at least 300 gallons of emulsified warm mix asphalt additive.
3. Proportioning for pre-blending the asphalt rubber binder and zeolite:
 - 3.1 Weigh dry warm mix asphalt additives with a belt scale or loss in weight feeder. If operating from 30 to 100 percent of production capacity, the average difference between the indicated weight of material delivered and the actual weight delivered must not exceed 2.0 percent of the actual weight for 3 individual runs. For any of the 3 individual runs, the indicated weight of material delivered must not vary from the actual weight delivered by more than 3.0 percent of the actual weight. The platform scale's maximum capacity must not exceed 2.5 tons with a maximum graduation size of 0.10 pound. Each test run must be at least 100 pounds of warm mix asphalt additive.
 - 3.2 The addition device will rest on (*a smooth level surface*) either concrete pads or steel plates. The steel plates will be 1.5 inch thick and be no smaller than 20 inches width and height.
 - 3.3 The asphalt rubber binder will be measured with a mass flow meter (micromotion). The accuracy of the addition device shall be such that, when operating between 30 and 100 percent of production capacity, the average difference between the indicated weight of material delivered and the actual weight of material delivered will not exceed 1.0 percent of the actual weight for 3 individual runs. For any of the 3 individual runs, the indicated weight of material delivered shall not vary from the actual weight delivered by more than 2.0 percent of the actual weight. Test duration will be determined by the size of the flowmeter, following the CT 109 specification.

Production and Placement

Produce an asphalt mixture within the temperature range of 275°F and 325 °F.
For RHMA-O with WMA:

1. Only spread and compact if the atmospheric temperature is at least 50 °F and surface temperature is at least 55 °F.
2. Complete the 1st coverage using 2 rollers before the surface temperature drops below 260 °F.
3. Complete compaction before the surface temperature drops below 180°F.
4. If the atmospheric temperature is below 70 °F, cover loads in trucks with tarpaulins. The tarpaulins must completely cover the exposed load until the mixture is transferred to the paver's hopper or to the pavement surface.

Material Transfer Vehicle

A material transfer vehicle (MTV) must be used. The MTV must:

1. Either receive HMA directly from the truck or use a pickup head to load it from a windrow that can be deposited on the roadway surface for a maximum of 100 feet in length.
2. Transfer HMA directly into the paver's receiving hopper or feed system
3. Remix the HMA, with augurs, before loading the paver
4. Have sufficient capacity to prevent stopping the paver

Vertical Joints

Before opening the lane to public traffic, pave shoulders and median borders adjacent to a lane being paved.

Place RHMA-O on adjacent traveled way lanes so that at the end of each work shift, the distance between the ends of RHMA-O layers on adjacent lanes is between 5 feet and 10 feet. Place additional RHMA-O along the transverse edge at each lane's end and along the exposed longitudinal edges between adjacent lanes. Hand rake and compact the additional RHMA-O to form temporary conforms. You may place Kraft paper, or another approved bond breaker, under the conform tapers to facilitate the taper removal when paving operations resume.

Conform Tapers

Place additional RHMA-O along the pavement's edge to conform to road connections and private drives. Hand-rake and compact the additional RHMA-O- to form a smooth conform taper.

Data Cores

Take data cores that include the completed HMA pavement, underlying base, and subbase material. Protect data cores and surrounding pavement from damage.

Take 4-inch or 6-inch diameter data cores:

1. At the beginning, end, and every 1/2 mile within the paving limits of each route on the project
2. After all paving is complete
3. From the center of the specified lane

On a 2-lane roadway, take data cores from either lane. On a 4-lane roadway, take data cores from each direction in the outermost lane. On a roadway with more than 4 lanes, take data cores from the median lane and the outermost lane in each direction.

Each core must include the stabilized materials encountered. You may choose not to recover unstabilized material but you must identify the material. Unstabilized material includes:

1. Granular material
2. Crumbled or cracked stabilized material
3. Sandy or clayey soil

PAYMENT

The contract price paid per ton for rubberized hot mix asphalt (open graded) using warm mix asphalt technologies includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, including warm mix additives, prepaving conference, material transfer vehicle, technical representation and data collection and testing, and for doing all the work involved in constructing rubberized hot mix asphalt (open graded) with warm mix asphalt additives, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract lump sum price paid for data core includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in data coring, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

BID ITEM LIST

03-2F0104

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
1	074016	CONSTRUCTION SITE MANAGEMENT	LS	LUMP SUM	LUMP SUM	
2	074017	PREPARE WATER POLLUTION CONTROL PROGRAM	LS	LUMP SUM	LUMP SUM	
3	074032	TEMPORARY CONCRETE WASHOUT FACILITY	EA	1		
4	074038	TEMPORARY DRAINAGE INLET PROTECTION	EA	22		
5	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM	LUMP SUM	
6	120100	TRAFFIC CONTROL SYSTEM	LS	LUMP SUM	LUMP SUM	
7	128650	PORTABLE CHANGEABLE MESSAGE SIGN	LS	LUMP SUM	LUMP SUM	
8	150662	REMOVE METAL BEAM GUARD RAILING	LF	2,500		
9	150771	REMOVE ASPHALT CONCRETE DIKE	LF	22,900		
10	150857	REMOVE ASPHALT CONCRETE SURFACING	SQFT	9,126		
11	151572	RECONSTRUCT METAL BEAM GUARD RAILING	LF	1,090		
12	152500	ADJUST METAL BEAM GUARD RAILING	LF	10,400		
13	153103	COLD PLANE ASPHALT CONCRETE PAVEMENT	SQYD	360,000		
14	190101	ROADWAY EXCAVATION	CY	3,000		
15	190110	LEAD COMPLIANCE PLAN	LS	LUMP SUM	LUMP SUM	
16	198007	IMPORTED MATERIAL (SHOULDER BACKING)	TON	4,640		
17	021915	WEED CONTROL MAT (FIBER)	SQYD	6,610		
18	260210	AGGREGATE BASE (APPROACH SLAB)	CY	12		
19	374207	CRACK TREATMENT	LNMI	47		
20	390132	HOT MIX ASPHALT (TYPE A)	TON	4,170		